

SCDHEC *Earth Today*

Lesson Grade Level: 6

Lesson Title: Agricultural Runoff.

SC State Science Standard(s):

(III, A, 1, a) Identify, investigate, and explain the processes of condensation, evaporation, precipitation, and runoff using a model or diagram.

Segment Link:

In the middle of the first part where they are discussing watersheds.

Lesson Overview:

This lesson requires the use of either the DHEC watershed demonstration model or one that the teacher creates (instructions for this following lesson plan). It can be taught either prior to the video or after as follow-up.

Background:

A watershed is an area in which all of the sources of running water and runoff drain into a particular body of water, such as a lake, stream or ocean. Whenever it rains, anything that is washed away by the runoff will eventually make it into the body of water at the base of the watershed. What this means to farmers is that any chemicals they put onto their crops (pesticides and fertilizers) as well as any waste from their animals will be washed into this body of water. Pesticides can put harmful chemicals into a water supply that not only affects the animals and plants in the body of water, but also any community that uses the river or lake for recreational uses (fishing, swimming and boating) or as a source of drinking water. Fertilizers and animal waste can affect the water by not only adding possibly dangerous chemicals and pathogens, but also by increasing the level of nutrients in the water which can result in the out-of-control growth of algae that can choke a lake or pond. Over-farming a field and leaving it barren can result in silt and sediment being washed into streams and rivers, clouding the water, blocking sunlight the aquatic plants need and choking the animal life.

Lesson Plan:

1. Using the model of a watershed with an agricultural site located on it, the teacher can demonstrate how different runoff sources of pollution are created in different areas by placing things at each location. If the teacher has already discussed possible sources of pollution with the class, he or she can further ask the class to contribute their own suggestions for types of runoff pollution.
2. Once all the sources of pollution have been placed, the teacher can spray water in the upland part of the model representing rain, illustrating to the students how all of the pollution runs downhill into a local lake.
3. After the demonstration, students return to their seats and write an activity report in which they describe what the model demonstrated and what they learned about the significance of runoff pollution with regards to agriculture.

Suggestions for making your own watershed model:

Get a large plastic tub. If possible, make a small hole in one corner and plug it up with a cork or stopper. Use gravel or sand to create a relief for your watershed. Cover the gravel or sand with modeling clay to prevent water from seeping into the dirt. Be sure to leave the area of

the tray uncovered where you placed the stopper. This will be your lake. Place toys on the model to represent different places (cars for communities, a cow or horse for a farm, a tractor for a field, etc.) Place different colored drink powders on the model to represent the different sources of pollution you want to illustrate. Spray the different areas of the model with water to represent rain and observe/point out to your students the colored drink powders as they flow into the lake.

Additional Teacher Background:

Watersheds
Storm drains
Water conservation

Runoff pollution (aka Nonpoint Source Pollution (NPS))

What is a Watershed? (From a lesson plan: www.tacoma.washington.edu)

“Watershed” is a new term to many people. The increasing use of soil and water conservation measures for watershed protection and flood prevention is bringing the term into more common use. Its definition is almost as simple as the well known phrase “water always runs down hill.”

The drain board that carries rinse water into your kitchen sink can be compared to a watershed.

On land, water that does not evaporate or soak into the soil usually drains into ditches, streams, marshes or lakes. *The land area from which the water drains to a given point is a **watershed**.*

When you were a small child, you probably had a favorite mud puddle in which you liked to play. The part of the yard from which the water drained into the puddle was its watershed.

Possibly a small stream ran by your house. It may have been dry most of the year or it may have flowed continuously. Water from a few acres drained into that little stream. Those few acres were its watershed. That small stream and others like it ran into a larger one. The land areas drained by the small streams made up the watershed of the larger stream into which they flowed. Small watersheds make up the larger ones. The Mississippi River, for example, drains a watershed of about 1,243,000 square miles.

Most lessons on watersheds relate to runoff pollution. By using maps, it is possible to relate geography and social studies to a study of watersheds and how the activities in them affect water quality locally and downstream.

There are many ways to create a water drainage area and learn from that creation. The lesson below from Texas uses tinfoil and sponges; another uses just a crumpled paper bag.

Wetlands/Watershed lesson from Texas (mostly relates to runoff pollution)
www.tnrcc.state.tx.us/exec/sbea/tes/lessons99/wetlandwatershed.html

NPS brochure mentioned in lesson above

www.tnrcc.state.tx.us/admin/topdoc/gi/162.pdf

Nonpoint source pollution information

<http://www.epa.gov/nps/>

Stenciling storm drains is a way for a group that learns about runoff pollution to take action and educate others about what they have learned. (Drains can also be marked using small signs that are glued near the drain.) One website to look at is Earthwater Stencils,

www.earthwater-stencils.org

Water conservation/water use

US EPA

www.epa.gov/OGWDW/kids/

Other Links

www.sfwmd.gov/curre/watshort/education.html

www.swfwmd.state.fl.us/infoed/educators/activities.htm

www.scdhec.net/water